

# BI-STATE SAGE-GROUSE PRELIMINARY PRIORITY HABITAT MAP

## A White Paper Prepared by the Bi-State Sage-Grouse Technical Advisory Committee (TAC)

December 2012

### Introduction

The Bi-State Sage-Grouse Preliminary Priority Habitat Map (Bi-State PPH map) illustrates habitat boundaries for the Bi-State Distinct Population Segment (DPS) of the greater sage-grouse (*Centrocercus urophasianus*; hereafter, Bi-State sage-grouse). The Bi-State PPH map is derived from sound science and provides land and wildlife managers with an analysis tool to guide sage-grouse management. This course-scale decision support tool will be refined periodically as additional information is acquired.

All areas illustrated in this map are considered priority because of the limitations in overall habitat availability in the Bi-State DPS, number of local populations, and population size. These populations also have a higher degree of isolation than other populations range-wide. Mapped preliminary priority habitat encompasses all of the seasonal habitats used by sage-grouse within the Bi-State DPS.

The Bi-State sage-grouse populations occur in Mono, Alpine, and Inyo Counties, California, and Carson City, Douglas, Esmeralda, Lyon, and Mineral Counties, Nevada. Population management units (PMUs) serve as management tools for defining and monitoring sage-grouse distribution. The PMUs that comprise the Bi-State area are Pine Nut, Desert Creek-Fales, Mount Grant, Bodie, South Mono, and White Mountains.

### Mapping Process

**Overview:** The Bi-State PPH map is based on two well-accepted modeling approaches: resources selection functions (RSFs) and utilization distributions (UDs). RSFs and UD were used to identify areas important to these populations based on associations with certain environmental characteristics and space use by sage-grouse respectively. RSFs were used to develop habitat suitability indices that rank areas based on a continuum of highly used to strongly avoided. UD provide a probability distribution surface, which indicates where populations occur in relation to active lek sites. Both processes were driven by actual location data obtained using radio-telemetry information.

**Summarized Methodology:** Priority habitat was identified using information derived from modeling RSFs and calculating UD. This data-driven approach used readily available broad-scale vegetation maps (e.g. SynthMap, LANDFIRE, SageStitch, FRAP) and more than 7 years of telemetry data and on-the-ground vegetation data collection from every PMU. Below is a brief description of the methodology.

1. First, a land cover map was developed for Nevada and California. This map was a synthesis of multiple existing broad-scale vegetation mapping products (e.g. SynthMap, LANDFIRE, SageStitch, FRAP). Additional map layers were developed for environmental factors thought to be important to sage-grouse. These additional layers included maps of pinyon-juniper cover classes used as surrogates for phases of encroachment, topographic variables (elevation,

ruggedness, and slope), agricultural areas, and anthropogenic factors (urbanization, roads, and recreation). Broad-scale mapping products have been assessed separately for accuracy and precision.

2. RSFs were developed by modeling the relative probability of occurrence as a function of different environmental factors which consisted of vegetation types, pinyon-juniper cover classes, agricultural areas, elevation, ruggedness, slope, roads, recreation, and urbanization. These factors were measured at multiple spatial scales that reflect movement patterns of sage-grouse. The modeling process contrasted these environmental factors for sites used by sage-grouse (>12,500 sage-grouse telemetry locations) to available sites (randomly generated locations distributed throughout each PMU). Contrasting the environmental factors of used versus available sites provided information about what factors were correlated with Bi-State sage-grouse selection or avoidance (e.g., urbanization, pinyon-juniper).

The Pine Nut PMU was analyzed separately from the other PMUs in the Bi-State DPS because this population exhibits strong differences in sage-grouse behavior and influential environmental factors.

3. RSFs were applied to the map layers developed in step 1 to calculate an overall probability of use per pixel. This created a single Bi-State habitat suitability map and resulted in a surface of predicted use by sage-grouse across the Bi-State DPS. This surface was represented by probability values that ranged across a continuous spectrum of 0.0 to 1.0.
4. To identify priority habitat, the values from the habitat suitability map were extracted for 1,300 independent sage-grouse telemetry point locations from independent sage-grouse (the telemetry points were not used in developing the RSFs). The 1,300 habitat suitability values were used to identify priority habitat because they are the values associated with areas known to be used by sage-grouse. These habitat suitability values were reclassified to binary values (priority habitat and not habitat) for each population management unit (PMU) by choosing suitability values above a cutoff value based on the mean of the 1,300 values minus two standard deviations.
5. The raster cells classified as habitat were converted to polygons and smoothed using a distance of one kilometer.
6. An area centered on lek sites was also included as priority habitat. This area was included to ensure consideration of potential adverse impacts that could result from the authorization of certain land management actions immediately adjacent to sage-grouse populations and habitats. The area also serves to identify potential habitat near active leks likely to be higher quality and used by sage-grouse if active habitat management can improve habitat suitability. The area size was based on UDs consisting of >12,000 telemetry points from >200 sage-grouse. A composite UD (population level) was calculated by summing individual seasonal UDs. In an iterative analysis, the percentage of the composite UD was calculated for each incremental increase in distance from leks. A distance of 5.23 km (3.25 mi) accounted for >90% of the probability of occurrence and nearly all seasonal core use areas (50% UD).
7. A distance of 5.23 km (3.25 mi) was applied to each lek in addition to the RSF approach. Therefore, polygons from the buffered leks plus those from the RSF-based analysis were included on the priority habitat map.

8. All urban areas were digitized and areas that exceeded 1 km<sup>2</sup> were excluded, along with all large-bodied standing water, because these areas are not considered habitat.
9. A second independent telemetry data set (>1,000 points) was used to validate the modeling; >99% of the telemetry points fell within the mapped priority habitat areas generated from the RSF and UD process.

### **Application for Management:**

Specific interim guidance through BLM Instruction Memorandum (IM) or USFS Interim Policy will apply in areas identified as priority habitat and will be in place until BLM Resource Management Plans (RMP) and USFS Forest Plans are amended/ revised to incorporate Bi-State sage-grouse conservation measures. BLM IM NV-2012-061 provides interim conservation policies and procedures for ongoing and proposed authorizations and activities that affect Bi-State sage-grouse. This direction ensures that interim conservation policies and procedures are implemented when the Carson District on Tonopah Field Office authorizes or carries out activities on public land during the current revision of the Districts' RMP.

The Humboldt-Toiyabe National Forest (NF) and Carson City BLM are working on a plan amendment and expect to issue Records of Decision (RODs) in December 2013. Carson BLM is currently going through the RMP revision process, which is scheduled for completion in 2015. In addition, existing land use plan guidance (e.g. Bishop RMP) specific to sage-grouse habitat conservation and management will apply in areas identified as priority habitat. Interim policies and existing land use plan guidance protects intact habitat, minimizes habitat loss and fragmentation, and manages habitats to maintain, enhance or restore conditions that meet Bi-State sage-grouse life history needs. BLM and USFS will not authorize discretionary activities that adversely impact Bi-State sage-grouse and/or their habitats.

The Bi-State Sage-grouse Priority Habitat Map is subject to change based on new information gained from monitoring data (future sage-grouse and habitat monitoring), improved vegetative mapping and changes to habitat (natural or man-induced).